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ABSTRACT

A sample of 640 children between 2.5 and 6 years old provided norms for scales of the Revised Gesell Preschool Examination. Scales focused on motor, adaptive, verbal, number, and personal and social development. A total of 272 children were reevaluated at 8.5 years on 22 variables derived from teacher ratings, parent questionnaires, and tests. The outcome variables were reduced to 8 moderately intercorrelated general scores and 3 factor scores. General score correlations with preschool scores ranged from 0 to the mid .70s, generally increasing with age up to 5.5 then decreasing at age 6. The preschool adaptive, verbal, and number scales, and a composite score, showed correlations with most outcome measures. The preschool personal and social scale showed correlations mainly with later personal and social scores. Preschool motor scores showed negligible correlations with any outcome measure. Associations with later scores were stronger for the preschool composite scores than for individual scales. Marked differences in distributions of outcome scores for children chosen as initially high or low on particular preschool scales indicated a useful degree of predictive validity for those scales. References and extensive tables are provided. (RH)

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The Revised Gesell Preschool Examination and Later Competence

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Abstract

A sample of 640 children, aged 2 1/2 to 6 years and stratified by paternal occupation, provided norms for scales of Motor, Adaptive, Verbal, Number, and Personal-Social development. At age 8 1/2, 272 of these children were reevaluated on 22 variables--from teacher ratings, parent questionnaires, and tests. The outcome variables were reduced to 8 moderately intercorrelated general scores and to 3 factor scores. General-score correlations with preschool scores ranged from zero to the mid .70s, generally increasing with age up to 5 1/2, then decreasing at age 6. The preschool Adaptive, Verbal, and Number scales, and a Composite score showed correlations with most outcome measures. The preschool Personal-Social scale showed correlations mainly with later Personal-Social scores. Preschool Motor scores showed negligible correlations with any outcome measure. Associations with later scores were stronger for the preschool Composite scores than for individual scales. Marked differences in distributions of outcome scores, for children chosen as initially high or low on particular preschool scales, indicate a useful degree of predictive validity for those scales.

The Revised Gesell Preschool Examination and Later Competence

The Revised Gesell Preschool Examination (Walker, in press) is the most recent in a 65-year-long succession of tests based on Gesell's observations of children. It resembles its immediate predecessors, described in The First Five Years of Life (Gesell et al., 1940) and Developmental Diagnosis (Gesell & Amatruda, 1941), and most recently in The Child from One to Six (Ames, Gillespie, Haines, & Ilg, 1979) and The Gesell Preschool Test Manual (Haines, Ames, & Gillespie, 1980). It is, in part, a reworking of data reported in The Child from One to Six.

Like its predecessors it is an age scale which charts, on a developmental schedule, a child's achievements in several domains of behavior: Motor, Adaptive, Language, and Personal-Social. Most of its items are the same as or similar to those described in the books listed above. It differs from the previous exams in that it groups the Language items to provide separate Verbal and Number scales, it spells out in more detail its methods of administration and scoring, it provides tables of standard scores by age for the five domains, based on a stratified sample of subjects, and it offers information on such properties as reliability.

For validating the Gesell exams, a problem has been finding criteria of this maturity, to serve as outcome measures. No single skill or accomplishment offers itself as a convincing marker of maturity. Instead, we have looked to a piling up of evidence from a range of behaviors. In the present study, the measures used for comparison with status on the Preschool Exam are (a) multiple--from several sources and measuring a range

of characteristics, including motoric, adaptive, and self-help skills as well as academic-intellectual ones--and (b) outcome measures--obtained from 2 to 6 years after the children were first tested as preschoolers. Of 640 children aged 2 1/2 to 6 years, used as subjects in the revision of the Preschool Exam, it was possible to retest 272 as 8-year-olds. Eight years was chosen as an outcome age because it was considered old enough to allow a fair preview of children's elementary school careers--which ones would likely be good or poor readers, for example--but soon enough after the original testings that reasonable numbers of children could be retested.

Subjects

The 640 children of the normative sample were tested in the 1970s: 40 and 40 girls at each half-yearly age from 2 1/2 to 6, within a month of the yearly or half-yearly birthday. At each age children were selected to fill a schedule of socio-economic status (SES) based on father's occupation. Unemployed fathers were tabulated under their customary occupations; where father's occupation was not given, mother's occupation was used. The sample was entirely a New England one. For many children race was not recorded; by estimate between 5 and 7% of children were nonwhite.

The 272 children retested as "8-year-olds" actually ranged from 7 years 5 months (7-5) to 9-11. Their mean age was 8.6 years, with a standard deviation (SD) of 0.6. At the time of their retesting, children were in grades one to four. Distributions of paternal occupations for the original sample and for the children retested are shown in Table 1, along with the U.S. distribution of occupations of employed adult males in 1970. There was little evidence that children who were retested differed in SES

Insert Table 1 about here

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from those who were not. Table 2 gives the mean standard scores obtained on the preschool exam by the children who were later retested, divided into a younger and an older group by age of original testing. It likewise shows

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Insert Table 2 about here

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little selective bias: the retested children differed negligibly in their original scores from the full sample's mean of 50 and SD of 10.

Measuring Devices

The Revised Gesell Preschool Examination

The preschool exam gives age-equivalent and standard scores for performance on five scales: Motor, Adaptive, Verbal, Number, and Personal-Social. For the eight age levels of the normative sample, the most homogeneous scales--Verbal and Number--had median reliabilities (alpha coefficients) of .91 and .94 respectively; the most heterogeneous scale, Personal-Social, had a median of .76. Median inter-scorer reliability was .98 in a sample of 60 records of 3-, 4-, and 5-year-olds, with lowest values (.93 and .95) for the scales involving most judgment calls: Adaptive and Verbal. Retest reliability, for 30 4-year-olds retested after 3 to 8 weeks, averaged .86 across the five scales. (Walker, in press.)

The Outcome Measures

Measures obtained at age 8 included the following. (a) The Wide Range

Achievement Tests of Reading, Spelling, and Arithmetic (Jastak, Bijou, & Jastak, 1965). (b) Ad hoc tests of gross and fine motor skills. The former included 11 activities, such as walking heel-to-toe and beanbag target throw. The latter included five activities, such as needle threading and winking. Standard scores were determined for each activity, with age partialled out; these scores were then averaged for each child.

(c) Four tests from the Gesell Developmental battery--Copy Forms, Incomplete Man, Monroe Memory for Designs, and Naming Animals (Ilg & Ames, 1964; Ilg, 1985). The first two tests were given developmental ratings by three experienced examiners, whose scores were then averaged. The third was scored for number of designs remembered correctly, the fourth for number of animals named in a minute's time. (d) An ad hoc parental questionnaire of 31 social-skill and self-help items, mostly from Gesell and Ilg (1946) and from the then-current Vineland Social Maturity Scale (Doll, 1965). Items were scored 0, 1, or 2 points--for no, sometimes, and yes--and these were summed for a total score.

(e) Eleven teacher ratings: 10 on variables like social maturity, and reading ability, the 11th on "ideal grade"--the grade the child would fit into best behaviorally, disregarding practical considerations (age, size). The first 10 ratings were intra-classroom comparisons on 5-step scales (for example, One of the 2-3 best readers in class, in top third of class, in middle third, in lower third, one of the 2-3 poorest readers). Since the children rated were in different grades, a corrector essentially equated the score of a child rated in the top third of an average first grade with that of one in the middle third of an average second grade and with one in

the lowest third of an average third grade. (f) The child's actual grade placement in school was also treated as an outcome variable.

Since children's ages ranged over two years at the time of their retesting, all measures were converted to standard scores with age partialled out. Some children's records were incomplete, most often missing teacher ratings (23 children). Each child's data were included for as many calculations as possible.

Results

Reduction of the Outcome Variables

General and factor scores. Two sets of scores summarize the 22 outcome variables. First, items were grouped into eight general scores, six of them intended to provide plausible parallels to the preschool scales of Motor, Adaptive, Verbal, Number, and Personal-Social development. The clustering was done on logical grounds and on the basis of inspection of the matrix of correlations among the measures. Each general variable was made up of scores on two or more measures, from two different sources. Table 3 lists the variables and their composition. Because reading ability

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Insert Table 3 about here

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is of interest in its own right, the reading measures were pulled out to form one general score as well as being included in the total Language score. A cluster labelled School Competence included ratings of good citizenship, attentionality, and "promotability" (actual grade level and teacher's rating of ideal grade).

Second, a more parsimonious condensation of the data was done by factor analysis. Several methods of factoring, using both raw scores and age-corrected scores, gave similar results: one large factor composed of all the teacher ratings, a separate academic achievement factor, and various groupings of other variables, usually with one factor centering on the Gesell test items. One set that gave clear results extracted three factors in an iterated principal factor analysis, varimax rotated, on the grade- and age-adjusted scores. The variables having loadings over .35 on each factor are listed in Table 4.

Insert Table 4 about here

The first factor, made up of all the teacher ratings, ranked the good-citizenship ones highest: a high score marked a generally and socially responsible student, having good work habits and long attention span. It has been labelled Competence. The second factor included measures of academic achievement, both test scores and teacher ratings, with the two reading measures leading the list. It has been labelled Achievement. The third factor, labelled Maturity, included the Gesell measures, teachers' judgments of ideal grade, and the acceleration or retardation of actual grade placement in relation to the child's age. The WRAT measures, parents' ratings of social maturity, and teacher ratings of motor skills were also included. Factor scores were computed for each child whose follow-up data were complete for every variable.

Intercorrelations among scores. Correlations among the eight general

and three factor scores are shown in Table 5. The teacher ratings, which were a component of every general score, were moderately intercorrelated to begin with and more so after the corrector for grade was introduced. This resulted in a set of considerably intercorrelated general variables: median

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Insert Table 5 about here

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correlation among the general scores was .58. Aside from the self-correlation between Reading and Language, the highest correlations among the general scores appeared among the classroom variables of Language, Arithmetic, and the cluster termed School Competence.

The factor scores were uncorrelated with one another. Factor I showed moderate to high correlations with every general score (since all of them included teacher ratings), in particular with School Competence. Factor II correlated chiefly with Reading and Language. Factor III correlated highest with Adaptive maturity, and showed a moderate relationship with every general score.

Correlations of Preschool and Outcome Measures

Table 6 presents the correlations of the children's standard scores on the general and factor variables at age 8 with their standard scores on the individual preschool scales and on a composite score, the sum of their preschool Adaptive + Language + Number + Personal-Social scores. Because of the small numbers of children followed up at the youngest ages, the six youngest age groups were combined in pairs: 2 1/2- and 3-year-olds were pooled, 3 1/2- and 4-year-olds, and 4 1/2- and 5-year-olds. The 5 1/2- and

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Insert Table 6 about here

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the 6-year-old groups are presented separately. Enough children were followed at those ages to give reasonable sample sizes, and combining the two groups would mask an unexpected finding: the drop in correlations among the 6-year-olds. As summarizing statistics, correlations with the 8-year-old variables are given for a younger sample--all the children aged 2 1/2 to 4 years--and an older sample--those aged 4 1/2 to 6.

The general-score correlations of Table 6 range from negligible to the mid .70s. The preschool Adaptive, Verbal, Number, and Composite scales showed significant correlations with most of the outcome measures, many of them sizeable. The preschool Personal-Social scale showed significant correlations with later Personal-Social scores but just scattered correlations with other outcome measures. And the preschool Motor scale showed only a few low correlations with any outcome measure.

Where correlations were significant, in general they showed the expected pattern of increasing size with increasing initial age. The peak correlations nearly all came at age 5 1/2, however; with a few exceptions, the correlations decreased at age 6.

For each preschool scale, the highest correlations with an outcome variable were usually with the one intended as a parallel measure. In every case, these correlations with the outcome measures were exceeded by the correlations between the Composite score and the same outcome measure. For example, the preschool Verbal score was the best single predictor of

later Language score; the preschool Composite score (adding in Adaptive + Number + Personal-Social) was a better predictor of later Language score.

Though the same individual tests made up the factor scores as made up the general scores, the highest correlations with preschool variables all occurred with the general scores. The Composite, Adaptive, and Personal-Social preschool scales showed their highest correlations, among the factor scores, with Factor III, here termed Maturity. The preschool Verbal and Number scales showed about equal correlations with all three factors, and the preschool Motor scale showed no relation to any factor score.

Comparison of Extreme Groups

Though the correlations showed significant associations between preschool scores and later status, they also showed much room for individual changes in relative status during the two- to six-year interval. Table 7 shows concretely the range of outcomes for individual children whose preschool scores were high or low in comparison with their agemates whose scores were within the middle 50% of scores. For this analysis, the preschool records were divided into a younger group, 2 1/2 to 4 years, and an older group, 4 1/2 to 6. Within these groupings, those children having

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Insert Table 7 about here

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the lowest and the highest 25% of scores for their particular ages were selected for each preschool scale. Distributions of outcome scores were then determined for the initially low- and high-scoring children.

For example, in Table 7, of the children aged 2 1/2 to 4 years who

fell in the lowest 25% of scores for their particular ages on the preschool Adaptive scale, 22 were retested on the Adaptive cluster at age 8. Of these 22, 41% fell in the lowest quartile (Q_1) of 8-year-old scores, while just 9% fell in the highest quartile (Q_4). This analysis was done for four of the five preschool variables, using each as a predictor of its corresponding 8-year-old variable, and also using the preschool Composite score. (Motor was omitted because of its low correlations with any later scores.) Reading was also included as an outcome variable, with its three highest correlates and the Composite used as predictors.

While findings differed for the different variables, Table 7 shows in terms of individual children the trends implied in Table 6. (a) Relatively many of the children scoring immature as preschoolers scored low on the 8-year-old measures; relatively many mature preschoolers later scored high. (b) The associations with later scores were stronger for the older children than for the younger ones. (c) The associations with later scores were stronger for the preschool Composite scores than for the individual scales.

Discussion

The Revised Gesell Preschool Exam showed considerable predictive validity across two to six years of growth. Scores of even the youngest subjects, initially aged 2 1/2 and 3, showed mostly significant correlations with the 8-year-old general variables, many between .40 and .50, while those of the 5 1/2-year-olds showed many correlations between .60 and .70 with these outcome variables. Only the preschool Motor scale failed to show relations with the later measures.

Size of the correlations was comparable to values typical in large-

scale longitudinal studies of growth in mental ability. For example, correlations for the Minnesota Preschool Scales (Goodenough & Maurer, 1942) and the California Pre-School Schedule (Honzik, McFarlane, & Allen, 1948) with mid-childhood status on other intelligence scales were similar to those between the Composite score and many of the 8-year-old measures here

The size of the general correlations is taken as assessing the predictive validity of the earlier scores, but it also reflects on the adequacy of the follow-up criteria. These latter were somewhat rough-and-ready measures: they contained several ad hoc scales, and the Verbal cluster did not even contain a vocabulary measure. More sharply defined outcome measures would have resulted in higher correlations with the preschool measures.

As measures of varieties of maturity, the factor scores were by design statistically independent of one another. Therefore they apportioned out each early-vs.-outcome relationship into several parts, and their separate correlations with the early measures were necessarily smaller than those found for the general variables. For example, though the general score School Competence and Factor I were highly correlated (r = .88), School Competence consistently showed higher correlations with the early measures than did Factor I. The broadest preschool scale, Composite, was most related to Factor III, here labelled Maturity. But use of the factor scores did not show sharply or consistently differential outcomes for the different preschool scores.

Motor Scale

Though the Motor scale was reasonably internally consistent (median

coefficient alpha of .90) and stable over a short time period (retest correlation of .86), it was the one preschool scale that showed no consistent relations with any later measures, including the later Motor scales. That is in keeping with the common finding of low correlations among individual motor skills and low age-to-age correlations, even with older children and adolescents (for example, Rarick & Smoll, 1966).

Since the preschool scale mixed fine and gross motor items--two or three fine and three or four gross motor items at each key age--it seemed that purer scales might relate better to the outcome measures. Therefore, the two types of items were separated and all children were rescored on a 24-item fine motor and a 36-item gross motor subscale. Neither subscale showed greater correlations with the outcome measures than the full Motor scale had done.

Measures of motor skills, particularly fine motor, are often taken to be important indicators of maturity or readiness. Here, no such evidence of long-term importance appeared for the Motor scale, though much appeared for the Adaptive scale, in which items involving drawing and printing skills were grouped. It may be the "total package" of perceptual-motor skill that is predictive, rather than the more isolated motor control apparently represented in this Motor scale.

Adaptive Scale and the Gesell Screening Exam

The preschool Adaptive scale showed relatively high correlations with a number of the outcome measures. As scored here, it resembles a nonverbal cognitive scale, somewhat analogous with the Performance scales of the WISC or WPPSI. Many of the same Adaptive-scale tests, but scored quite

differently, form the nucleus of the Gesell Screening Examination, a short test used for grade placement at school entrance (Haines, Ames, & Gillespie, 1980; Ilg, 1982). For that exam the tests are rated globally to give a measure of developmental maturity, conceived of as different from cognitive brightness, though related to it. (Though mature children tend to be brighter than average, and immature children less bright, one encounters bright but immature children.)

Experienced judges rated the Screening Exam portions of the records of the 400 4- to 6-year-old children of the present sample (Walker, 1989). Correlation of the mean judges' ratings with scores on the Adaptive scale of the Revised Preschool exam, both in standard scores by age, was .81 for the full sample. The preschool Adaptive scale agreed with the judges' mean ratings about as highly as the individual judges agreed with one another. The judges' ratings showed correlations with the outcome measures just about as high as did the preschool Adaptive scale, taken alone, though in general not as high as did the preschool Composite measure.

Verbal Scale

The Verbal scale was the most like an intelligence scale, with two of its main tests borrowed from early mental ability scales--Action Agent (Woodworth & Wells, 1911; Stutsman, 1931) and Picture Vocabulary (Terman & Merrill, 1937, 1973). The collection of outcome measures in the 8-year-old Language scale was not very satisfactory: reading and spelling, teacher ratings of reading and of language maturity, and a fluency measure, but no vocabulary or verbal reasoning measures. Even so the preschool Verbal scale was an increasingly strong predictor of this later Verbal measure.

Number Scale

The preschool Number scale was a late entry, was short of items at the youngest ages, and overly weighted recall of numbers (digit repetition). Nevertheless, it showed correlations of .36 to .68 with a well defined outcome measure: an arithmetic test score plus a teacher rating of number concept maturity.

Personal-Social Scale

Gesell's Personal-Social scale resembled Doll's Vineland Social Maturity Scale (1935, 1965)--and therefore its descendants (Sparrow, S. S., Balla, D. A., & Cicchetti, D. V., 1984). Confusingly for our usage, others have called this self-help ability adaptive behavior (for example, Mercer, 1973). As in most of these other efforts to judge customary, out-in-the-world behavior, preschool Personal-Social development was assessed through an interview with an informed adult rather than through tests of the child.

Preschool Personal-Social development correlated mainly with later Personal-Social score. That outcome measure included a questionnaire answered by the parent whose responses had assessed Personal-Social maturity two to six years earlier. For ages 2 1/2 to 6 pooled, the correlation of Personal-Social standard score with the 8-year-old parent questionnaire was .43, that with teacher rating of social maturity was .22, and that with the two combined was .38 (*ns* of 250-272; all *ps*<.01).

Composite Score

This summary score weighted equally the standard scores for all the scales, excluding Motor. (When Motor was included, virtually all of the Composite score's correlations with the outcome measures decreased.)

Dropping the Personal-Social scale from the Composite resulted in slightly higher correlations between the Composite score and the 8-year-old Reading and Language scores from a majority of preschool ages, and slightly lower correlations with the remaining outcome measures.

The preschool Composite score showed a robust set of correlations with later effectiveness in a wide range of skills. The drop in correlations at age 6 appeared less for the Composite than for the other outcome measures. School Competence, the most direct measure of success in school, showed no such drop in its correlation with preschool Composite score.

Why the outcome correlations made from age 6 were generally lower than those made from age 5 1/2 remains a puzzle. The obvious explanation of an abrupt ceiling effect appears inadequate. Standard deviations of scores at age 6 were nearly as large as those at 5 1/2, and scatter diagrams showed no obvious flattening. The same finding of decreased correlations from age 6 appeared in the screening ratings of the judges, who were experienced also in rating records of 7-, 8-, and 9-year-olds and had effectively no ceilings for their composite ratings. Chance sampling differences may have occurred, either in the original samples or in those followed up. Tests of further samples may provide an answer.

The problem of the criterion remains: what outcome measures can be used for judging the effectiveness of the preschool measures. What we offer here is a number of different aspects of outcomes, reflected in less-than-perfect measures. The finding that children's high or low status on the early measures has substantial bearing on those outcomes indicates a useful degree of validity of the early measures.

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Table 1

Percentage Distribution of Fathers'[a] Occupations for Normative Sample and for Children Retested at Age 8, Compared with 1970 U.S. Census Data

Occupation	1970 Census[b]	Original sample, ages 2½-6 (n = 640)	Children retested at age 8 (n = 272)
A. Professional and technical	14.9	15.0	15.0
B. Managers, officials, proprietors	15.2	15.0	16.1
C. Clerical and sales	12.5	12.5	12.7
D. Craftsmen and foremen	21.1	21.3	28.8
E. Operatives	19.4	18.8	12.7
F. Farmers and farm laborers	5.1	5.0	3.5
G. Service workers	6.0	6.3	7.3
H. Nonfarm laborers	6.1	6.3	3.8
A-C. Total white collar	42.5	42.5	43.8
D-H. Total blue collar	57.5	57.5	56.2

[a]Mother's occupation used where father's occupation not given.

[b]Distribution of employed males, 20 years and over, 1970 U.S. Census, with the not reported category (4.6%) spread proportionally across the remaining categories.

Table 2

Means and Standard Deviations (SD) of Preschool Standard Scores of Children Later Tested at Age 8

Scale	Age at first testing			
	$2\frac{1}{2}$-4 years (n = 110)		$4\frac{1}{2}$-6 years (n = 162)	
	Mean	SD	Mean	SD
Motor	51.4	9.7	50.8	10.2
Adaptive	50.8	9.7	51.1	9.6
Verbal	49.6	10.0	50.7	9.5
Numerical	49.6	10.0	51.4	9.8
Personal-social	50.5	9.9	50.4	9.5

Table 3

Composition and Sources of General Scores

General score	Component measure	Source
Gross motor ability	Gross motor score	Test score
	Gross motor skill	Teacher rating
Fine motor ability	Fine motor score	Test score
	Fine motor skill	Teacher rating
Adaptive ability	Adaptive maturity	Teacher rating
	Gesell Copy Forms	Test score
	Gesell Incomplete Man	Test score
	Monroe Memory for Designs	Test score
Language ability	WRAT Reading ability	Test score
	Reading ability	Teacher rating
	WRAT Spelling ability	Test score
	Language maturity	Teacher rating
	Naming animals	Test score
Reading ability	WRAT Reading ability	Test score
	Reading ability	Teacher rating
Number ability	WRAT Arithmetic ability	Test score
	Number-concept maturity	Teacher rating

(table continues)

Table 3, continued

General score	Component measure	Source
School Competence	Attentic : span	Teacher rating
	Work habits	Teacher rating
	Maturity level	Teacher rating
	Ideal grade placement	Teacher rating
	School grade for age	Administrative action
Personal-social maturity	Personal-social maturity	Parent questionnaire
	Social maturity	Teacher rating

Table 4

Follow-Up Variables Having Highest Loadings on Their Respective Factors

Variable	Loading
Factor I: Competence	
Teacher rating: General maturity	.86
Teacher rating: Social maturity	.82
Teacher rating: Attention span	.81
Teacher rating: Work habits	.80
Teacher rating: Fine motor skill	.71
Teacher rating: Language ability	.70
Teacher rating: Number-concept maturity	.66
Teacher rating: Adaptive ability	.63
Teacher rating: Gross motor skill	.61
Teacher rating: Ideal grade	.59
Teacher rating: Reading ability	.59
Test: Gesell Copy Forms	.37
Factor II. Achievement	
Test: WRAT Reading	.63
Teacher rating: Reading ability	.63
Test: WRAT Spelling	.61
Teacher rating: Adaptive maturity	.51
Teacher rating: Number-concept maturity	.48
Teacher rating: Language ability	.37

(table continues)

Table 4, continued

Variable	Loading
Factor III. Maturity	
Test: Gesell Copy Forms	.66
Teacher rating: Ideal grade	.46
Test: WRAT Arithmetic	.46
Test: WRAT Reading	.41
Test: WRAT Spelling	.40
Grade for age	.38
Parent questionnaire: Personal-social development	.37
Test: Monroe Memory for Designs	.37
Test: Gesell Incomplete Man	.35

Table 5

Intercorrelations Among General and Factor Scores at Age 8

Variable	General Scores							Factor Scores		
	FM	AD	LA	RE	AR	PS	SC	I	II	III
General Scores										
Gross Motor (GM)	.44	.51	.53	.46	.49	.54	.61	.52	.16	.50
Fine Motor (FM)	--	.51	.42	.44	.46	.45	.56	.61	.02	.35
Adaptive (AD)		--	.66	.62	.61	.55	.61	.45	.34	.73
Language (LA)			--	.91	.71	.60	.73	.52	.76	.51
Reading (RE)				--	.71	.57	.70	.50	.80	.42
Arithmetic (AR)					--	.58	.75	.60	.52	.48
Personal-social (PS)						--	.74	.69	.12	.44
School Competence (SC)							--	.88	.36	.41
Factor Scores										
Competence (I)								--	.10	.11
Achievement (II)										.14
Maturity (III)										--

Note. For general scores, ns range from 247 to 272; for factor scores, n = 221.

Table 6

Correlations of Preschool Standard Scores, by Age Group, with Standard Scores at Age 8

Preschool Scale	8-Year-Old General Scores									8-Year-old Factor Scores			
	n	Gross motor	Fine motor	Adaptive	Language	Reading	Number	Pers-social	Competence	n	I Comp.	II Ach.	III Matur.
Motor													
2½-3	56-60	.21	.13	.17	.40**	.34	.12	.29	.22	46	.16	.28*	.18
3½-4	48-50	.27	.04	.06	.04	.01	.16	.11	.20	43	.12	.04	.05
4½-5	68-74	.31**	.29*	.19	.19	.20	.24*	.04	.22	59	.17	.24	.12
5½	39-40	.08	-.03	-.10	-.13	-.10	-.18	.00	-.24	32	-.13	-.06	-.24
6	46-47	.23	.08	.05	-.03	.01	.09	.04	.09	41	.22	-.14	.11
2½-4	105-110	.24	.07	.12	.25**	.19*	.10	.20*	.19	89	.13	.16	.12
4½-6	157-162	.23**	.14	.06	.04	.07	.09	.02	.09	132	.12	.01	.05
Adaptive													
2½-3	56-60	.41**	.32*	.38**	.45**	.45**	.43**	.51**	.50**	46	.42**	.32*	.36*
3½-4	48-50	.20	.24	.36*	.17	.13	.28*	.30*	.23	43	.29	-.14	.34*
4½-5	67-74	.29*	.28*	.53**	.47**	.46**	.42**	.31**	.38**	59	.20	.34*	.48**

(table continues)

Table 6, continued

Pre-school Scale	8-Year-Old General Scores									8-Year-Old Factor Scores			
	n	Gross motor	Fine motor	Adaptive	Language	Reading	Number	Pers-social	Competence	n	I Comp.	II Ach.	III Matur.
Adaptive, cont.													
5½	39-41	.41**	.56**	.68**	.62**	.71**	.64**	.54**	.44**	32	.23	.47**	.54**
6	46-47	.31*	.16	.46**	.44**	.36*	.44**	.33*	.50**	41	.44**	.22	.35*
2½-4	105-110	.30**	.25**	.35**	.30**	.26**	.33**	.38**	.33**	89	.31**	.03	.33**
4½-6	157-162	.33**	.31**	.51**	.50**	.49**	.50**	.38**	.43**	132	.28**	.30**	.44**
Verbal													
2½-3	56-60	.37**	.22	.40**	.47**	.40**	.32*	.48**	.42**	46	.30*	.29*	.28
3½-4	48-50	.37**	.18	.39**	.27	.21	.37*	.32*	.39**	43	.40**	.07	.22
4½-5	68-74	.23	.42**	.49**	.51**	.47**	.47**	.23*	.41**	59	.26*	.37**	.34**
5½	39-41	.32*	.35*	.43**	.60**	.65**	.45**	.48**	.35*	32	.21	.36*	.32
6	46-47	.11	-.01	.29*	.46**	.40**	.32*	.13	.28	41	.01	.38*	.20
2½-4	105-110	.37**	.19*	.39**	.40**	.31**	.33**	.40**	.40**	89	.33**	.17	.25*
4½-6	157-162	.21++	.28**	.42**	.51**	.48**	.42**	.25**	.36**	132	.19*	.36**	.30**

(table continues)

Table 6, continued

Pre-school Scale	n	8-Year-Old General Scores								n	8-Year-Old Factor Scores		
		Gross motor	Fine motor	Adaptive	Language	Reading	Number	Pers-social	Competence		I Comp.	II Ach.	III Matur.
Number													
2½-3	56-60	.24	.18	.15	.35**	.30*	.13	.19	.14	46	.08	.32*	.16
3½-4	48-50	.35*	.08	.42**	.40**	.39**	.47**	.34**	.34**	43	.26	.21	.48**
4½-5	68-74	.31**	.20	.41**	.45**	.45**	.36**	.29*	.40**	59	.23	.36**	.43**
5½	39-41	.39*	.51**	.64**	.65**	.68**	.68**	.41**	.60**	32	.52**	.49**	.34
6	46-47	.18	.17	.38**	.38**	.30*	.43**	.24	.40**	41	.26	.22	.19
2½-4	105-110	.28**	.15	.26**	.37**	.34**	.28**	.26**	.23*	89	.17	.26**	.29**
4½-6	157-162	.29**	.27**	.46**	.48**	.46**	.49**	.31**	.43**	132	.29**	.34**	.34**
Personal-social													
2½-3	56-60	.07	.04	.28*	.09	.11	.16	.36**	.12	46	.05	.06	.22
3½-4	46-50	.53**	.21	.44**	.30*	.20	.38**	.55**	.51**	43	.27	-.11	.49**
4½-5	68-74	.18	.20	.35**	.23*	.22	.31**	.24*	.21	59	-.02	.22	.45**

(table continues)

Table 6, continued

Pre-school Scale	n	8-Year-Old General Scores								n	8-Year-Old Factor Scores		
		Gross motor	Fine motor	Adaptive	Language	Reading	Number	Pers-social	Competence		I Comp.	II Ach.	III Matur.
Personal-social, cont.													
5½	39-41	.20	.34	.20	.19	.16	.03	.45**	.18	32	.27	.00	.22
6	46-47	.16	.24	.10	.14	.07	.14	.39**	.31*	41	.33*	-.13	.17
2½-4	105-110	.25**	.10	.34**	.17	.14	.24	.43**	.28**	89	.12	-.02	.31**
4½-6	157-162	.18*	.25**	.24**	.20*	.16	.20*	.34**	.23**	132	.14	.05	.33**
Composite													
2½-3	56-60	.36**	.25	.40**	.45**	.41**	.34*	.51**	.39**	46	.27	.34*	.34*
3½-4	46-50	.50**	.25	.56**	.40**	.33*	.52**	.52**	.50**	43	.43**	.01	.53**
4½-5	68-74	.33**	.36**	.58**	.54**	.52**	.50**	.34**	.45**	59	.22	.42**	.55**
5½	39-41	.45**	.60**	.67**	.71**	.74**	.60**	.65**	.55**	32	.44*	.45*	.49*
6	46-47	.29*	.21	.46**	.52**	.40**	.52**	.45**	.57**	41	.40*	.27	.35*
2½-4	105-110	.42**	.24*	.47**	.43**	.37**	.41**	.51**	.44**	89	.33**	.16	.42**
4½-6	157-162	.35**	.38**	.56**	.57**	.53**	.53**	.44**	.50**	132	.31**	.36**	.48**

(table continues)

Table 6, continued

Note. Pers-social = Personal-social; Comp. = Competence; Ach. = Achievement; Matur. = Maturity.

*$p < .05$. **$p < .01$.

Table 7

Quartile Distributions of Outcome Scores for Children Initially Scoring in the Lowest 25% or Highest 25% on Preschool Scales, in Two Preschool Age Groupings

Preschool variable and status	Eight-year-old status									
	Initial age 2½-4					Initial age 4½-6				
	n	Q_1	Q_2	Q_3	Q_4	n	Q_1	Q_2	Q_3	Q_4
					Adaptive					
Adaptive score										
Low	22	41	32	18	9	32	47	19	22	13
High	25	0	16	48	36	48	2	19	31	48
Composite score										
Low	26	54	27	12	8	33	52	24	18	6
High	27	0	26	41	33	45	7	13	29	51
					Verbal					
Verbal score										
Low	31	42	23	26	10	40	55	20	15	10
High	22	9	18	36	36	46	2	13	30	54
Composite score										
Low	26	50	23	15	12	33	58	27	6	9
High	27	7	22	33	37	46	0	15	24	61

(table continues)

Table 7, continued

Preschool variable and status	Eight-year-old status									
	Initial age 2½-4					Initial age 4½-6				
	n	Q_1	Q_2	Q_3	Q_4	n	Q_1	Q_2	Q_3	Q_4
					Number					
Number score										
Low	27	44	22	19	15	40	55	13	23	10
High	22	9	18	36	36	52	12	17	27	44
Composite score										
Low	26	54	27	8	12	33	61	15	18	6
High	27	11	11	30	48	46	9	17	28	46
					Personal-Social					
Pers-Social score										
Low	26	35	38	19	8	40	40	23	23	15
High	30	10	20	27	43	49	4	14	29	53
Composite score										
Low	27	44	26	22	7	34	50	26	9	15
High	29	7	14	31	48	48	8	8	35	48

(table continues)

Table 7, continued

Preschool variable and status	Eight-year-old status									
	Initial age 2½-4					Initial age 4½-6				
	n	Q_1	Q_2	Q_3	Q_4	n	Q_1	Q_2	Q_3	Q_4
					Reading					
Adaptive score										
Low	22	36	27	13	23	32	59	9	19	13
High	26	8	35	23	35	49	8	16	35	41
Verbal score										
Low	31	32	26	23	19	40	58	20	13	10
High	22	14	27	9	50	46	2	20	30	48
Number score										
Low	27	30	33	15	22	40	58	15	18	10
High	22	14	18	27	41	52	12	17	29	42
Composite score										
Low	26	42	27	15	15	33	64	18	12	6
High	27	7	33	22	37	46	2	11	35	52

Note. Preschool Composite score = sum of standard scores on Adaptive + Verbal + Number + Personal-Social scales.